
Chapter 3



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3.5 WETLANDS

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3.5.1 Introduction

Wetlands are defined in terms of their physical, chemical, and biological characteristics, such as hydrologic regime, soil type, and plant species. Wetlands are formally defined as those areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (40 CFR 230.41 (a) (1)) and WAC 222-16-11. This definition includes forested swamps, marshes, bogs, and other similar areas. Wetlands are subject to regulation through the Clean Water Act by the Corps of Engineers and the Environmental Protection Agency. Sections 404 and 401 of the Clean Water Act were created specifically with the intent “to restore and maintain the chemical, physical and biological integrity of our nation’s waters” (see Section 1.4.3.4).

Wetland ecosystems provide a variety of physical and biological functions. Additionally, they provide many values to society including recreation, water quality enhancement, and flood attenuation. The National Wetland Policy Forum (Conservation Foundation, 1988) identified eight natural functions that wetlands may perform at a landscape level. These functions are: (1) nutrient removal and transformation; (2) sediment and toxicant retention; (3) shoreline and bank stabilization; (4) flood flow alteration; (5) groundwater recharge; (6) production export; (7) aquatic diversity and abundance; and (8) wildlife diversity and abundance. Values to society of these wetland functions include recreation, water quality enhancement, and flood control.



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3.5.2 Affected Environment

3.5.2.1 Wetland Functions

As noted above, wetlands provide a variety of functions and values. The key wetland functions that are the focus of this EIS include fish and wildlife habitat, water quality, and hydrology. These functions were chosen because they are the ones that may be most directly impacted by timber harvest related activities. The functions are briefly discussed below.

Fish and Wildlife Habitat

Wetland and riparian habitats are considered to be among the richest zones for aquatic and terrestrial organisms (Clark, 1977; Dodd, 1978; Brinson et al., 1981; Kauffman and Krueger, 1984). Because wetland and riparian habitats exhibit an “edge effect” due to overlapping types of habitats, more niches are provided by these areas than are provided by any other habitat types. Eighty-six percent (359 out of 414) of the terrestrial vertebrate species in western Washington and 85 percent (320 out of 378) of terrestrial vertebrate species in eastern Washington utilize wetland and associated riparian habitats for portions of their life needs (Brown, 1985; Thomas, 1979).

Wetlands provide habitat or perform functions that contribute to the health of ecosystems of many anadromous and resident fish species within Washington. Wetlands are known to help maintain cool water temperatures, retain sediments, store and desynchronize flood flows, maintain stream base flows, and provide food and cover for fish (Cederholm and Scarlett, 1981; Beechie et al., 1994; Mitsch and Gosselink, 1993; DOE, 1993).

Water Quality

Wetlands can improve water quality through nutrient removal and transformation (Hammer, 1989). For example, wetlands can remove nitrate and phosphorus from agricultural runoff. Nutrient-rich sediments may also become trapped and removed from the water. Wetlands can also remove toxic chemicals, such as pesticides, heavy metals, or excess nutrients from water (Mitsch and Gosselink, 1993). Wetlands can reduce shoreline and bank erosion by binding soil substrates in wetland plant roots. Thus, wetlands protect upland habitats along streams and rivers from erosion, and protect downstream habitats from sedimentation and pollution. Wetlands can help maintain desirable stream temperatures in the summer as they discharge cool groundwater. Additionally, forested riparian and wetland areas serve an important role in shading streams from direct solar heating.

Hydrology

Headwater riverine and depressional wetlands can delay discharge of peak run-off into streams and impede passage of overbank flow downstream during storm events, thus reducing the potential for downstream flooding (Winter, 1988; Roth et al., 1993). Depressional wetlands can help maintain existing quantities of groundwater by delivering water to underlying aquifers (Dinicola, 1990; Economic and Engineering Services Inc., 1991). Additionally, wetlands can help maintain minimum stream base flow by naturally regulating the release of groundwater discharge into streams and by recharging aquifers



that discharge groundwater to streams (Dinicola, 1990; Hidaka, 1973; O'Brien, 1988; Mitsch and Gosselink, 1993).

3.5.2.2 Historic/Current Wetland Protection

Wetlands are subject to regulation under Sections 401 and 404 of the Clean Water Act. Discharge into wetlands may also be regulated under section 402 of the Clean Water Act. Exemptions granted under Section 404(f)(1) allow for normal agricultural, ranching, and silvicultural activities, as well as maintenance of existing drains, farm ponds, and roads. The construction or maintenance of forest roads for silvicultural purposes is exempt from regulation when such roads are constructed and maintained in accordance with best management practices (BMPs). The BMPs “assure that flow and circulation patterns and chemical and biological characteristics of water of the United States are not impaired, that the reach of the waters of the United States is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized.”

On private and state lands in Washington, the FPRs provide protection for wetland resources from timber harvest-related activities. For management purposes, the FPRs recognize two major categories of wetlands: forested and nonforested. Nonforested wetlands are divided further into two classes: Type A (greater than 0.5 acre, with open water) and Type B (other nonforested wetlands). FPRs require buffers, termed WMZs, on all Type A wetlands and most Type B wetlands. Harvest may occur in forested wetlands; however, harvest methods are to be limited to low impact harvest or cable systems.

For Type A wetlands greater than 5 acres in size and containing open water, an average WMZ of 100 feet is required. For Type A wetlands between 0.5 and 5 acres, a 50-foot average WMZ is required. For Type B wetlands greater than 5 acres, a 50-foot average WMZ is required. For other wetlands between 0.5 and 5 acres, a 25-foot WMZ is retained. Wetlands less than 0.5 acre have no buffer.

In addition to leaving WMZs, there are several other harvest restrictions around nonforested wetlands. For example, individual trees and small patches of forested wetlands (0.5 acre) cannot be harvested if surrounded by a Type A or Type B wetland. Harvest of upland areas or larger forested wetlands require a plan approved by the DNR if they are surrounded by Type A or Type B wetlands. Additionally, Timber cannot be felled into or cable-yarded across a Type A or Type B wetland without prior approval by DNR.

3.5.2.3 Existing Condition of Wetlands

Since the time of colonization, Washington state has lost between thirty to fifty percent of its wetlands (National Wetlands Inventory; USFWS, 1999). Additionally, the functions of existing wetlands have been reduced. Various factors have contributed to wetland loss and wetland function reduction including agriculture development, urbanization, timber harvest, road construction, and other land management activities. It is difficult to assess the current conditions of wetlands in forested lands across the entire state of Washington. However, some wetlands on lands subject to FPRs have been altered in the past due to actions associated with timber harvest activities, such as harvest and road building. These actions can impact wetland sites directly through vegetation alteration, soil compaction,



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and changes in hydrologic regime and water quality or indirectly through sedimentation from adjacent land management practices. Additionally, harvest of trees in or adjacent to wetland sites can impact microclimates of wetland sites. Other impacts to wetlands have likely occurred from fires and other natural disturbances.

Wetlands are described in this document using the DNR wetland GIS coverage, which separates wetland habitats into two major categories: forested and nonforested. The nonforested wetland are further divided into Type A wetlands (greater than 0.5 acre, including any acreage of open water) and Type B (other non-forested wetlands), and other (forested wetlands and open water habitats).

Overall, approximately 4.4 percent of the land base evaluated for this section is comprised of wetland habitats (Table 3.5-1). Wetland areas comprise approximately 2 percent of the land base on the east side and approximately 6 percent on the west side. The percent of wetlands by type in the sample sections subject to FPRs can be found in Table 3.5-1.

Table 3.5-1. Approximate Wetland Area as a Percentage of Forested Ownership, by Region and Wetland Type^{1/}

Region	Ownership	Type A Wetland	Type B Wetland	Other Open Water	Forested Wetland
Westside	Private Lands	0.7 percent	<0.1 percent	<0.1 percent	5.7 percent
Eastside	Private & State Lands	0.4 percent	<0.1 percent	<0.1 percent	1.2 percent
Statewide	Private and State on Sampled lands	0.6 percent	<0.1 percent	<0.1 percent	3.8 percent

^{1/}Based on random sample of lands subject to FPRs in each region/ownership category (see Appendix G).

3.5.3 Environmental Effects

3.5.3.1 Evaluation Criteria

The evaluation criteria for this EIS for wetland resources includes an analysis of the degree of protection provided by the Forest Practices Rules for wetlands and their associated functions (i.e., water quality, hydrology, and fish and wildlife habitat). Provisions under the alternatives that are evaluated against the evaluation criteria include timber harvest (application of protective buffers (WMZs and RMZs) and the degree of harvest or disturbance allowed in forested wetlands), road management practices, and application of new wetland mapping and classification systems.

Timber Harvest

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Timber harvest and associated activities can affect wetland sites by changing species composition, reducing stand density and shading, changing fuel profiles, and altering disturbance regimes (Castelle et al., 1992; Harris and Marshall, 1963; Darnell, 1976). Timber harvest may alter wetland hydrology and cause a rise in the water table elevation (Veery, 1997). Changes in hydrologic patterns of wetland sites can directly influence plant



species and growth within the wetland site resulting in an increase in undesirable plant species. Additionally, the altered water table and associated streamflow relationship could increase localized runoff and flooding (Grigal and Brooks, 1997). Soil rutting and compaction from timber harvest activities can reduce infiltration, redirect flow, and alter pathways by which water moves through and from wetlands.

Water quality of wetland sites can be affected by harvest activities (Shepard, 1994). Harvest and associated activities can deliver sediment to wetlands, diminish water quality and lead to the filling of wetland sites. Nutrient pathways within wetlands can also be affected.

Alterations of forested wetland sites discussed above can impact microclimates within wetland sites and can effect habitats of associated fish and wildlife species. Changes to wetland hydrology may diminish suitable amphibian breeding, feeding, and rearing habitat (Hruby et al., 1998). Reduced cover and changes in plant species composition can influence invertebrate populations (Cyr and Downing, 1988) and impact food sources, den/nest sites for aquatic mammals, birds, and amphibians (Hruby et al., 1998). Additionally, fish populations in waterways associated with harvested forested wetlands may be effected by increased sedimentation and hydrologic and temperature alterations.

A method of reducing impacts to forested wetland sites is to implement reduced harvest scenarios and restrict equipment operation and yarding practices in these areas. Residual vegetation left behind after reduced harvest and associated activities would provide shading for wetland sites and act as a buffer to filter out sediments and pollutants (Broderson, 1973; Corbett and Lynch, 1985). Effects on wetland hydrology would be reduced in light harvest areas. As a result, impacts to fish and wildlife would be reduced.

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Due to the lack of commercial timber within nonforested wetland habitats, these areas would not be harvested. However, adjacent timber harvest may indirectly impact these sites through increased sedimentation from upslope timber harvest activities and potential reduction of shading from removal of adjacent trees. These disturbances could disrupt nutrient pathways, affect water temperatures, and affect hydrology within these nonforested wetlands, causing short-term indirect effects on water quality, vegetation composition, and microclimates.

A method of reducing impacts on wetlands from land management activities is to apply a protective buffer around wetland sites. Characteristics of buffer zones, particularly slope and vegetative cover, directly influence buffer zone effectiveness. The effectiveness of removing sediments, nutrients, bacteria, and other pollutants from surface water runoff increases with buffer width. Although buffer protection distances for wetlands can vary markedly, depending upon site conditions, buffers of 100 feet or greater have been found to control course and fine sediments if channelization in the buffer zone does not occur (Broderson, 1973; Corbett and Lynch, 1985; Lynch et al., 1985). Additionally, buffers of at least 100 feet have been found to minimize water temperature fluctuations (Lynch et al.,



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1985). To protect wetland values for wetland-associated wildlife species, slightly larger buffers, ranging from 200-300 feet, are generally needed (WDW, 1992).

Wetland buffers or WMZs that are required under the alternatives are described in Table 3.5-2.

Table 3.5-2. WMZs under Alternatives 1, 2, and 3

Wetland Type	Size of Nonforested Wetland (in acres)	Alternatives 1 and 2 Average WMZ width	Alternative 3 Average WMZ width
A (including bogs)	> 5	100	200
A (including bogs)	0.5 to 5	50	200
A (bogs Only)	0.25 to 0.5	50	200
A (including bogs)	< 0.25	No WMZ required	No WMZ required
B	> 5	50	100
B	.5 to 5	25	100
B	0.25 to 0.5	No WMZ required	100
B	< 0.25	No WMZ required	No WMZ required
Forested		No WMZ required, some restrictions may apply	Leave 70 percent canopy closure, understory vegetation, snags, and non-merchantable trees.

Road and Landing Management

Road construction in wetland areas can directly impact wetland sites by permanently removing or eliminating the biological functions (i.e., water quality, hydrology, and fish and wildlife habitat) from the affected portion of the wetland. Additionally, crossing wetlands with roads, without adequate provision for cross-drainage, can lead to flooding on the upslope side and drainage changes on the downslope side of crossings (Stoeckeler, 1967; Boelter and Close, 1974). Road and landing construction and use can deliver sediment to wetlands, diminish water quality and lead to the filling of wetland sites. Nutrient pathways within wetlands can also be affected.

Avoidance of wetlands during road and landing layout is a primary method for eliminating direct impacts to wetlands associated with road and landing establishment. Where wetlands can not be avoided, a method of offsetting impacts from road construction includes the implementation of wetland replacement mitigation measures. Mitigation ratios may vary depending upon the type, size, and health of an effected wetland site. Additionally, best management practices implemented during road and landing construction and use can minimize associated impacts to wetland sites. Road management options under the alternatives are outlined in Chapter 2 and Appendix F.

Wetland Classification System

Wetland ecosystems in the United States occur under a wide range of climatic, geologic, geomorphic, and hydrologic conditions. This diversity of conditions makes the task of assessing wetland functions difficult, because not all wetlands perform functions in the same manner, or to the same degree. Therefore, to simplify the assessment process, it is useful to classify wetlands into groups that function similarly. Classification narrows the focus of attention to: (1) the functions a particular type of wetland is most likely to



perform, and (2) the characteristics of the ecosystem and landscape that control these functions. Classification provides a faster and more accurate assessment procedure, thereby providing land managers a better tool for identifying and protecting wetlands, or mitigating for lost wetlands or wetland functions (water quality, hydrology, and fish and wildlife habitat).

Current DNR wetland classification and mapping is based on the National Wetland Inventory (NWI) maps, which uses the Cowardin classification system (Cowardin et al., 1979). Wetlands are mapped and classified based on size, vegetative structure, and hydrology. A shortcoming of this classification system is that it does not identify functional values of wetland sites. In contrast, hydrogeomorphic classifications group wetlands on the basis of three fundamental characteristics: geomorphic setting, water source, and hydrodynamics. At the highest level of the classification, wetlands fall into one of five basic hydrogeomorphic classes including; depressional, slope-flat, riverine, fringe, and extensive peatland.

A hydrogeomorphic classification can be applied at a regional level to narrow the focus even further. The regions identified by Omernik (1987), Bailey (1994), or Bailey et al. (1994) are based on climatic, geologic, physiographic, and other criteria and provide a convenient starting point for applying the classification within a region. Any number of regional hydrogeomorphic wetland subclasses can be identified based on landscape scale factors such as geomorphic setting, water source, soil type, and vegetation. The number of regional subclasses identified depends on the diversity of conditions in a region and assessment objectives.

A description of wetland mapping and classification provisions under the alternatives can be found in Chapter 2 and Appendix G.

3.5.3.2 Evaluation of Alternatives

Timber Harvest

FORESTED WETLANDS

Under all the alternatives, forested wetlands may be harvested with some restrictions (Table 3.5-2). Harvest of forested areas on or adjacent to wetland sites would have the greatest short-term impacts on these resources by changing species composition, reducing stand density and shading, altering disturbance regimes, altering successional rates and pathways, altering hydrologic regimes, increasing undesirable vegetation, and altering nutrient/chemical cycles (Castelle et al., 1992; Harris and Marshall, 1963; Darnell, 1976). The greatest restrictions (protection) for forested wetlands occur under Alternative 3 since a minimum of 70 percent canopy closure along with understory vegetation, snags, and non-merchantable timber must be retained. This harvest restriction associated with Alternative 3 would lessen impacts to wetlands, particularly hydrologic alterations and impacts on fish and wildlife habitat. Under Alternative 1 and 2 a level of protection is afforded to forested wetlands associated with nonforested wetlands sites. Harvest of forested wetlands which are surrounded by open water and emergent wetlands must be conducted in accordance with a plan, approved in writing by the department. Additionally, under Alternative 2,



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Alternative 3 provides the greatest protection to forested wetlands, when compared to Alternatives 1 and 2, since a minimum of 70% canopy closure must be retained after harvest.

Forested wetlands receive incidental protections under the alternatives through the establishment of WMZs and RMZs, in proportion to the widths of these zones under the alternatives.

The greatest level of protection to non-forested wetlands occurs under Alternative 3, when compared to Alternatives 1 and 2, due to greater widths of established WMZs.

forested seeps and springs with an obvious connection to Type N perennial streams are protected. Also under Alternative 2, a wetlands working group would be established to conduct research and, through the adaptive management process, provide recommendations directed at improving protection of forested wetlands. The adaptive management process in Alternative 2 and the functional classification method in Alternative 3 would decrease the likelihood of an adverse effect on stream flows because these methods can be used to understand the hydroperiod of different wetland types or complexes prior to developing harvest plans.

WMZs and RMZs established under the alternatives provide varying levels of incidental protection to forested wetlands sites. Reduced management may occur in these buffers to varying degrees (see Table 3.4-2 and Section 3.4 *Riparian Section*), however, impacts to hydrologic, water quality, and fish and wildlife functions of incidentally protected wetlands would likely be reduced. The greatest degree of incidental protection would occur under Alternative 3 where 52 percent of forested wetlands would be protected under established WMZs and RMZs followed by Alternative 2 (27 percent) and Alternative 1 (20 percent) (Table 3.5-3). The high degree of incidental wetland protection provided under the alternatives is mainly due to protection provided to riparian associated wetlands through the establishment of RMZs. Incidental protection would also occur to non-forested wetland sites; however, because these sites are non-forested, no management activity in these areas is anticipated.

NON-FORESTED WETLANDS

Under all alternatives, non-forested wetlands are provided varying levels of protection through the application of WMZs. Wetland type and size determine the widths of WMZs and their application (Table 3.5-2). The greatest level of protection to wetland sites occurs under Alternative 3 due to greater widths of established WMZs, and application of a WMZ for Type B wetlands between 0.25 and 0.5 acre (Table 3.5-2). Under this alternative, all Type A nonforested wetlands greater than 0.25 acre would receive a minimum average WMZ of 200 feet, and all Type B wetlands greater than 0.25 acre would receive a minimum average buffer of 100 feet.

Alternatives 1 and 2 provide similar levels of protection to non-forested wetland sites (Table 3.5-2 and Section 3.5.2.2).

Table 3.5-3. Percent of Forested Wetlands in Sample Sections Incidentally Protected through the Establishment of WMZs and RMZs

Alternative and Wetland Type	Percent of Wetlands Protected by WMZs Only			Percent of Wetlands Protected by RMZs Only			Percent of Wetlands Protected by Both WMZs and RMZs			Total Incidental Protection
	East Side	West Side	State Wide	East Side	West Side	State Wide	East Side	West Side	State Wide	State Wide
Alternative 1	15%	5%	6%	6%	14%	13%	1%	1%	1%	20%
Alternative 2	12%	4%	6%	12%	21%	20%	4%	1%	2%	27%
Alternative 3	13%	9%	10%	27%	35%	34%	20%	7%	8%	52%



As stated earlier, although site-specific characteristics of wetland sites dictate buffer need requirements, in general, a protective buffer width of 100 feet or greater has been found to provide protection to wetland sites from hydrologic and water quality impacts including sedimentation and temperature alteration, and water table fluctuations. Larger buffers may be required to provide protection to habitat for fish and wildlife species associated with wetland sites. Therefore, using this rational, Alternative 3 would provide the greatest level of protection by providing buffers of 100 feet or greater to areas of Type A and B wetlands. Additionally, unlike Alternative 1 and 2, Alternative 3 provides a WMZ for Type B wetlands between 0.25 and 0.5 acre (Tables 3.5-2). Alternative 1 and 2 would provide less protection to the non-forested wetland sites due to reduced buffer widths and WMZ applications.

WMZs are provided incidental protection under all alternatives through the establishment of RMZs.

It must also be noted that management may occur within established WMZs under all the alternatives. Management activities within these buffers can reduce the functional value of the WMZs. Additionally, timber harvest may indirectly impact wetlands through increased sedimentation from upslope timber harvest activities and potential reduction of shading from removal of adjacent trees. These disturbances can disrupt nutrient pathways within these wetland sites causing short-term indirect effects on water quality, vegetation composition, and fish and wildlife. Additionally, harvest of adjacent areas could initially increase water tables in harvested areas due to reduced transpiration from tree removal. However, if the WMZ is revegetated quickly, impacts may be reduced. Consequently, long-term effects are expected to be minor. Additionally, some areas of the WMZs are provided incidental protection by the establishment of RMZs. Prescriptions within RMZs are dependent upon water types and other site conditions. For this section, the area (acres) of RMZs that overlap onto WMZ under the alternatives were evaluated, however, the individual prescriptions within the RMZs were not identified. Under Alternative 3 approximately 43 percent of wetland buffers occur with established RMZs and, therefore, would be provided incidental protection (Table 3.5-4). Under Alternative 2, approximately 27 percent and under Alternative 1 approximately 15 percent would occur within RMZs. These WMZs are expected to receive fewer disturbances due to their inclusion in RMZs although the level of incidental protection in these areas will be dependent upon the specific prescriptions of the RMZs and location of the WMZs in relation to the RMZs (core zone, inner zone, or outer zone of the RMZ).

Table 3.5-4. Percent of WMZs in Sample Sections on Forested Lands Incidentally Protected through the Establishment of RMZs Under the Alternatives

Alternative	Percent of WMZ within RMZ
Alternative 1	15%
Alternative 2	27%
Alternative 3	43%

Road Management

As stated earlier, road construction and use may have the greatest direct impact on wetland sites by permanently removing portions of the affected wetland from the landscape.



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Further, roads that cross wetlands without adequate provision for cross-drainage can lead to hydrologic changes (Stoeckeler, 1967; Boelter and Close, 1974). Additionally, sedimentation from road construction and use has been found to indirectly impact wetland ecosystems (Stoeckeler, 1967; Boelter and Close, 1974). To offset impacts to wetland sites from these actions, BMPs and wetland replacement mitigation is proposed under the alternatives.

When compared to Alternative 1, Alternatives 2 and 3 provide the most stringent protection/mitigation measures by implementing a policy of no net loss in wetland functions following road and landing construction.

Under Alternative 1 wetlands would be avoided during road and landing planning and construction. If wetlands could not be avoided, impacts would be reduced by minimizing subgrade width and spoil areas. Applications which propose to fill or drain more than 0.5 acre of an individual wetland (Class IV-special) would require an accurate wetland delineation and replacement of the lost wetland functions. This would be accomplished by replacing the lost wetland functions by enhancement of existing wetlands or creation of new wetlands, generally with an acre for acre basis and of the same type and in the same general location.

Alternative 2 and 3 contain the most stringent protection/mitigation measures by implementing a policy of no net loss in wetland functions following road and landing construction. Under these alternatives, roads cannot be constructed in bogs or fens or in wetlands if there would be a substantial loss or damage to wetland functions or acreage. Additionally, accurate wetland delineation must be performed if a road or landing construction fills or drains more than one-tenth of an acre of a wetland, which would better quantify wetland impacts than Alternative 1. Filling or draining more than 0.5 acre of a wetland is classified as a Class IV-special action and requires a replacement by substitution or enhancement of the lost wetland functions, generally with a two-for-one basis of the same type and in the same general location. Additionally, sediment deposition to wetland sites would likely be reduced (compared to Alternative 1) during road and landing construction and use due to the implication of new BMPs (see Appendix F, Forest Roads).

Classification System and Wetland Mapping

As described earlier, the current wetland classification and mapping system (Alternative 1) used by the DNR for application with the FPRs is based on the NWI system. This wetland classification system does not identify functions of wetland types within the affected landscape, and therefore, is a less effective tool for evaluating wetland impacts or developing protection or mitigation measures.

Under Alternative 3, a new wetland classification system, likely hydrogeomorphic, is to be adopted. A hydrogeomorphic system could provide additional protection to wetland areas by identifying functions of wetland types within the landscape, thereby providing a mechanism for implementing applicable protection measures. This system could provide a tool for comparing project alternatives and pre- and post- project conditions for determining impacts. Additionally, it could compare mitigation success to provide guidance for avoiding and minimizing project impacts, and to determine mitigation requirements.



Under Alternatives 2 and 3, new wetland classification systems incorporating wetland functions would be developed.

Under Alternative 2, a similar wetland mapping and classification system is proposed in accordance with procedures and other provisions of the Adaptive Management program (see Appendix I). Applications of the procedures and provisions of the Adaptive Management program are subject to funding and priorities. Under Adaptive Management, a wetlands working group would be convened to further define functions of forested wetlands, revise the current wetland classification system based on wetland functions, evaluate the regeneration and recovery capacity of forested wetlands, evaluate current WMZs, perform research on wetland functions, recommend what functions of forested wetlands need to be provided, and determine wetland size and functions that trigger any needed mitigation sequence. Under Alternative 2, landowners would be required to perform additional wetland mapping procedures (Chapter 2 and Appendix G: Wetlands). The DNR would incorporate the mapped wetlands into a GIS layer. This increased mapping effort would enhance the ability to apply wetland protection measures outlined in the FPRs.

Summary of Alternatives

Overall, Alternative 3 was found to have the greatest level of protection for wetland resources, due to WMZ and RMZ widths and the level of forested wetland protection. For road and landing construction, Alternatives 2 and 3 provide greater protection to wetlands than Alternative 1 by implementing a policy of no net loss of wetland functions, outlining higher replacement mitigation ratios for wetlands (of 0.5 acre in size) that are filled or drained, and avoiding roads and landings in bogs and fens. Additionally, Alternatives 2 and 3 require accurate delineation of wetlands where impacts to wetlands would be 0.1 acre or more. These alternatives would also reduce potential sedimentation of wetland sites through the application of new BMPs. Alternative 3 mandates the adoption of a new classification system that would incorporate the evaluation of wetland functions, thus providing a better tool for evaluating wetland impacts and designing wetland protection and mitigation measures. Alternative 2 also incorporates this measure under Adaptive Management; however, development of this classification system and other research proposed under this alternative is contingent upon funding and priority evaluation. Alternative 2 was found to provide greater protection than Alternative 1 because it mandates the mapping of select wetland types and incorporates these into a DNR GIS database that would provide data for wetland evaluation and protection measure development.

To some extent, wetland functions (i.e., hydrology, water quality, and fish and wildlife habitat) are likely to be reduced under all the alternatives since forested wetlands may be harvested; however, wetland impacts under Alternative 3 are expected to be less due to the 70 percent canopy retention in forested wetlands. Non-forested wetlands receiving a buffer of less than 100 feet may be impacted by adjacent timber harvest. However, these functions would likely be reduced for the short-term if the wetland sites or buffers become revegetated. All of the alternatives contain provisions for mitigation for wetland loss due to road and landing construction. However, “no net loss” of wetlands or wetland functions due to road or landing construction is anticipated to occur only under Alternatives 2 and 3.



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